



March 1, 1999

Mr. Frank Anscombe
U.S. Environmental Protection Agency
Region 5 (G-17J)
77 West Jackson Boulevard
Chicago, IL 60604

Re: Great Lakes Binational Toxics Strategy Octachlorostyrene (OCS)
Report: A Review of Potential Sources, December 22, 1998 Draft

Dear Mr. Anscombe:

The Halogenated Solvents Industry Alliance, Inc. (HSIA) strongly disagrees with the conclusions of the above referenced draft report concerning the potential contribution of chlorinated solvents production and metals degreasing to releases of octachlorostyrene (OCS). HSIA represents manufacturers of several chlorinated solvents, as well as numerous companies that use these solvents to degrease metal parts.

The draft report lists both metals degreasing and chlorinated solvents production as "documented" sources of OCS, and provides an estimate of OCS releases from solvents production. In the case of metals degreasing, the draft report provides no data to support its assertion that the degreasing process is similar to aluminum degassing. To develop its estimate of releases from chlorinated solvents production, the report employs old data, unsupported assumptions about the ratio between OCS and hexachlorobenzene (HCB), and flawed estimates of HCB emissions.

1 Metals Degreasing

Chlorinated solvents have for many years been used to degrease oils, greases, and other contaminants from metal parts. In the typical process, the solvent is heated to its boiling point and the contaminants are flushed by the solvent vapors as they condense on the part in the vapor zone. To ensure effective cleaning, contaminants are periodically removed from the boiling sump and disposed of as hazardous waste.

In its discussion of metals degreasing, the draft report suggests that:

As in aluminum degassing, the reaction of chlorinated solvents with carbon deposits on the metal at elevated temperatures *may* generate OCS as a byproduct in the contaminated solvent drained from the machine or in the organic impurities that accumulate in the sump. *emphasis added*

The draft offers no data to support this contention, instead relying on the tenuous comparison to the aluminum degassing process. In the information provided for degassing, however, the draft notes that the production of OCS has been found to occur at 600° C. As indicated previously, the temperatures routinely encountered in the sump of a vapor degreasing are around the boiling point of the solvent (121°C or less). Clearly, the degreasing process does not provide sufficient energy to facilitate the series of reactions necessary to produce OCS. Even in a poorly maintained degreaser, where contaminated sludge has accumulated on the heating coils in the boiling sump and temperatures may rise above the boiling point, safety controls required on the equipment shut off the heat supply well below the temperatures encountered in aluminum degassing.

The report also fails to consider the fact that chlorinated solvent waste generated in the boiling sump of a vapor degreaser is subject to strict storage, handling, and disposal requirements under the nation's hazardous waste regulations. These wastes may not be discarded in a landfill and generally are destroyed in hazardous waste incinerators or cement kilns. To the extent that destruction of degreaser wastes may contribute to release of OCS, the draft report already addresses such wastes in its consideration of incineration processes.

2 Chlorinated Solvents Production

Chlorinated solvents production does appear to have been a source of OCS contamination in the past. The available data cited in the draft report indicate that OCS can be produced during the manufacture of chlorinated solvents and that OCS has been detected in the effluent from solvent manufacturing operations in studies conducted in the 1980s or earlier. The draft report does not attempt, however, to evaluate changes in the manufacturing process over the last 10 to 15 years. The most obvious change is that chlorinated solvents are no longer manufactured in the Great Lakes region. Secondly, as discussed in the enclosed information developed by EPA's Office of Pollution Prevention and Toxics (OPPT), the potential for OCS production is dependent on the process used to manufacture the solvents. Finally, in those facilities where OCS may be produced, waste products from solvent production currently are reused in other processes or incinerated, and are not discharged to surface waters or disposed of in a way that could lead to such discharge.

3 Rather than use current data on OCS in solvent production effluent, or even data that were collected in the 1970s or 1980s, the draft report bases its OCS estimate on estimates of HCB releases from solvent production. This approach is significantly flawed for two reasons. The draft report uses the average ratio of OCS to HCB in sediments, without data or even a rationale to support the assumption that the sediment ratio would be the same as in solvent production wastes. The April 1998 estimate for HCB releases used in the draft, moreover, is significantly overstated.

Appendix A of the draft report provides a table of OCS/HCB ratios found in sediments that have been reported in the literature. A review of this table suggests that the ratio varies considerably, even among samples taken in the same area at the same time. It is reasonable to suspect, based on the information, that there may be processes that differentially alter the concentration of one pollutant relative to the other. Pereira et al (1988), in fact, suggest a "salting-out" effect in the Bayou d'Inde area to explain differences in levels found in sediments and water. Despite the variation in the reported ratios, the draft report offers no rationale for using the ratio found in sediment or for selecting an average of all of the reported sediment ratio information.

Although HSIA does not necessarily disagree with the use of an OCS/HCB ratio for estimating potential releases, we believe that the ratio should be based on

actual measurements from waste streams. We note that pollutant information is available from samples of waste streams from production facilities in Ontario and Louisiana. Data from the Ontario facility, collected in the 1980s, indicate an OCS/HCB ratio of 0 to 0.057 in effluent samples (King and Sherbin, 1986). The enclosed OPPT report, moreover, uses a ratio 0.073 in deriving its estimate of potential OCS production.

4 Use of the OCS/HCB ratio also depends, of course, on the accuracy of the estimate for HCB. HSIA has submitted comments (enclosed) to EPA's Air Office concerning the flaws in the April 1998 inventory for HCB, the source used by the draft report. To summarize our comments, EPA's inventory analysis uses Toxic Release Inventory (TRI) reporting data from a small number of facilities and extrapolates these data to all U.S. facilities based on production capacity rather than actual production.

HSIA believes that TRI data overestimate actual emissions because they are based on theoretical (worst-case) calculations, rather than actual measurements. In reviewing the TRI data for 1996, however, we find a total of 451 pounds of HCB reportedly released to the environment (250 pounds to water, 201 pounds to air) from manufacturers of chlorinated solvents. We suggest that this is a more accurate estimate to use as a basis for estimating OCS releases than the figure reported in EPA's April 1998 inventory.

Please do not hesitate to contact me if you have any questions about the information provided above.

Sincerely,

Stephen P. Risotto
Executive Director

Enclosures

APPENDIX G

OCTACHLOROSTYRENE

G.1 CHEMICAL PROFILE

Octachlorostyrene (OCS) (CAS 29082-74-4) is a polychlorinated styrene that is a possible byproduct of chlorine production, chlorination reactions, and metal product/finishing operations (EPA, 1998) such as the production of metallic magnesium (Knutzen and Oehme, 1989) and dry etching of aluminum (Raabe et al., 1993). OCS may also be formed by the high-temperature incineration of chlorinated hydrocarbons (EPA, 1998). OCS is not a commercial product, and no commercial uses are known. Industrial processes that may be sources of OCS include the following:

- Radical initiated chloralkene polymerization, a process involving aromatic radicals, vinyl or styrene monomers, and chlorine atom sources;
- Electrolysis of chloride salts in processes using graphite or carbon anodes at temperatures greater than 275°C. This process may be used in the production of chlorine, aluminum, sodium metal, tantalum metal, and niobium metal;
- Manufacture of metallic magnesium using carbon electrodes;
- Fused salt electrolysis, a process used to produce sodium from sodium chloride;
- Aluminum production that utilizes a smelting process created by Alcoa in 1976, that incorporates alumina, carbon, chlorine, and a carbon electrode at high temperatures;
- Incineration of chlorine-containing plastics and organic chemicals (EPA, 1984);
- Degassing of molten aluminum with hexachloroethane (HCE) (Westberg et al., 1997); and
- Production of perchloroethylene and carbon tetrachloride using the Stauffer or Scientific Design processes (Markovee and Magee, 1984).

Historically, OCS byproduct was generated in the manufacture of chlorine from aqueous sodium chloride or potassium chloride by an electrolytic process. The electrolytic process, involving an anode made of powdered graphite with a coal tar pitch binder, leads to the production of a mixture of chlorinated organics that are later removed as a waste byproduct. This waste byproduct, known as “taffy”, may contain OCS. The improper disposal of the taffy may release OCS into the environment (Kiminsky, 1984). Powdered graphite anodes with coal tar pitch binders were used exclusively for chlorine production until 1979; however, the development of noble metal oxide coatings on titanium substrates has led to a drastic reduction in the use of graphite electrodes. Most chlorine producers presently use ruthenium oxide or titanium oxide coated titanium anodes rather than graphite anodes (Kroschwitz, 1994); five manufacturers are expected to still use graphite anodes in their production processes (EPA, 1986, EPA, 1995b). OCS production from operations not employing graphite anodes is considered unlikely due to the lack of a carbon source in these processes.

OCS has been identified as a byproduct from the manufacture of carbon tetrachloride (CTC) and perchloroethylene (PCE). These chemicals are commercially produced using the Stauffer or Scientific Design processes; both processes involve high-temperature chlorinolysis (550 to 600°C) of propylene in an excess of chlorine (Markovee and Magee, 1984). The recovered products of the reaction are CTC, PCE, and chlorine. Chlorinated, high-boiling residues are also produced; these residues form a “hex-waste” byproduct consisting primarily of hexachlorobenzene, hexachlorobutadiene, and hexachloroethene (HCE). Heavier compounds, including OCS, are present at lower concentrations (Markovee and Magee, 1984).

OCS is also a potential byproduct of the production of metallic magnesium. The process involves electrolyzing magnesium chloride to metallic magnesium and chlorine using a carbon electrode. The process leads to the formation of considerable amounts of chlorinated hydrocarbons, including OCS. According to the International Magnesium Association, there are two metallic magnesium plants operating in the United States that use carbon electrodes. The combined capacity of these two facilities is 100,000 metric tons of metallic magnesium per year (IMA, 1998).

OCS byproduct is also produced during degassing of molten aluminum with HCE (Westberg et al., 1997) at aluminum foundries and secondary smelting plants. Hydrogen gas from the surrounding water vapor is readily dissolved in molten aluminum and causes deficient mechanical properties in the resulting aluminum castings. Degassing operations remove the hydrogen gas from the molten aluminum. Gaseous emissions from HCE-based aluminum degassing have demonstrated high yields of complex organochlorine compounds, including HCB and OCS (Westberg et al., 1997).

G.2 CURRENT TOXICS RELEASE INVENTORY (TRI) STATUS

OCS is not currently reportable to TRI.

G.3 ESTIMATED NUMBER OF ADDITIONAL REPORTS TO TRI

This section estimates the number of TRI reports that may be submitted for OCS at various lower reporting thresholds. The reporting thresholds analyzed are 1 pound; 10 pounds; 100 pounds; and 1,000 pounds. The following estimates assume that the *de minimis* exemption would be eliminated; thus, TRI reporting is expected from facilities manufacturing, processing or otherwise using OCS above the reporting thresholds, regardless of the concentration.

G.3.1 ANALYTICAL METHODS

This subsection explains the methods used to estimate the number of additional facilities that may submit TRI reports for OCS at various lower reporting thresholds.

Although potential industrial sources of OCS have been identified, information is limited regarding the amount of OCS manufactured as a byproduct. For the industrial sectors without OCS data, hexachlorobenzene (HCB) was chosen as a surrogate to estimate the amount

of OCS manufactured as well as the number of potential TRI reports. HCB and OCS are structurally similar chemicals; both are a benzene ring surrounded by chlorine atoms. The difference between the two molecules is the substitution of a styrene molecule (carbon and hydrogen) for a chlorine atom at one of the benzene ring carbons. Based on the available information and the structural similarity of OCS and HCB, these chemicals appear to be manufactured as byproducts in many of the same processes. It is unknown whether OCS is also present as an impurity in products containing HCB as an impurity (e.g. chlorinated solvents). For this analysis, it is assumed that OCS does not remain with the manufactured product, but is removed with the process wastes.

Chemicals and Allied Products (SIC Code 28)

To estimate the number of facilities which may report OCS to TRI for various 4-digit SIC codes in the Chemicals and Allied Products Category, information on the amount of HCB and OCS produced in comparison to product yield for the manufacture of CTC and PCE by the Stauffer or Scientific Design processes (Markovee and Magee, 1984) was used. The ratio of OCS to HCB byproduct manufactured in SIC Code 2869 was then applied to the minimum quantities of HCB inferred from the TRI information (EPA, 1995b) to estimate the amount of OCS produced per facility in other 4-digit SIC codes.

The manufacture of CTC and PCE by the Stauffer or Scientific Design processes involves the chlorination of propylene, followed by distillation to separate and recover CTC and PCE. Under optimum conditions, 96 percent of the propylene is converted to CTC and PCE. The remaining 4 percent of propylene is converted to a byproduct residue termed "hex-waste", of which HCB is a major component (assumed to be 75%). The other byproducts compose the remaining 25% of hex-waste, 22% of which is OCS (Markovee and Magee, 1984). Using the stoichiometric relationship between CTC and PCE manufacture from propylene and the waste generation and composition from the literature, approximately 0.0048 pounds of OCS byproduct is manufactured per pound of PCE manufactured. The calculated OCS:HCB production ratio is 0.073 lbs OCS/lb HCB from the CTC and PCE manufacturing process. The estimated concentration of OCS in the total amount of hex waste generated from the process is 5.5 percent.

From this information, the estimated amount of OCS from each facility in SIC code 2869 can be determined. Three facilities in SIC Code 2869 supplied enough PCE to meet a demand for 290 million pounds in 1997 (Chemical Marketing Report, 1997). Each facility therefore produces approximately 464,000 lb OCS as a byproduct per year, as shown below.

$$(290 \text{ million lb PCE/yr}) \times (0.0048 \text{ lb OCS / lb PCE}) / (3 \text{ facilities}) = 464,000 \text{ lb OCS/facility/yr}$$

To determine which additional 4-digit SIC Codes in the Chemical and Allied Products category may manufacture OCS as a byproduct, and to estimate the amount per facility, the 1995 TRI reports for HCB were analyzed. According to the 1995 data, facilities in SIC codes 2812, 2865, and 2879 submitted TRI reports for the manufacture of HCB (EPA, 1995b). Using the TRI data, HCB production was estimated to be 25,000 lb per facility reporting in 1995 or the combined releases and off-site transfers of HCB, whichever amount was greater. Table G-1 presents a summary of estimated amount of HCB manufactured and the calculated OCS production amounts based on the CTC and PCE data for the three SIC codes. The estimated

amount of OCS manufactured on a per facility basis was estimated by dividing the total amount manufactured by the number of facilities in the SIC code. The amount of OCS per facility is provided in Table G-5 at the end of this section and was used to estimate the number of reports at the various thresholds.

**TABLE G-1
ESTIMATED OCS MANUFACTURE
BASED ON HEXACHLOROBENZENE MANUFACTURE/RELEASES**

SIC Code	Number of Reports	Estimated Amount of HCB Manufactured (lb/year) (EPA, 1995b)	OCS:HCB ratio	Estimated Amount of OCS Manufactured (lb/year)
2812	4	100,000	0.073	7,300
2865	1	25,000	0.073	1,800
2879	3	470,468 ^a	0.073	34,300

^aOne facility reported 420,468 lb of HCB releases and off-site transfers for 1995 (EPA, 1995b). This facility is estimated to manufacture approximately 30,694 lb OCS as a byproduct.

The number of facilities that may submit TRI reports for OCS at various thresholds for SIC Code 2812 (alkalis and chlorine) were estimated from the Final Draft Report - Exposure Assessment for HCB (EPA, 1986). According to the report, only five chlorine manufacturing facilities in the United States had not converted from graphite (carbon) electrodes to metal electrodes by 1984. The 1995 TRI information shows that 4 chlorine manufacturing facilities had reported HCB manufacturing. This data indicates that at least 4, and possibly 5 chlorine manufacturing facilities are still using carbon electrodes and may submit TRI reports for OCS.

The number of facilities that may submit TRI reports for OCS at various thresholds for SIC codes 2865 and 2879 was estimated using the following method:

- Using the *Standard Industrial Classification Manual* (Executive Office of the President, 1987), those 5-digit SIC codes most likely to manufacture OCS as a byproduct were identified. Those SIC codes were 28651, 28652, 28653, 28655, 28656, 28795, 28796, 28797, 28798, and 28799.
- At the 4-digit SIC code level, the percentage of facilities in each identified SIC code having 10 or more full-time employees was obtained from the *1995 County Business Patterns* (Department of Commerce, 1995); and
- The number of facilities from the *1992 Census of Manufactures, Industry Series* (Department of Commerce, 1992) in each of the identified 5-digit SIC codes was multiplied by the calculated percentage of facilities in the corresponding 4-digit SIC code having 10 or more full-time employees.

The data for the steps outlined above are presented in Table G-2. By dividing the number of facilities shown in Table G-2 into the amount of OCS manufactured per year (Table G-1), the amount of OCS manufactured per year, and therefore the TRI reporting threshold can be determined. Because it is assumed that every facility in the 5-digit SIC code with 10 or more employees is manufacturing OCS as a byproduct, this estimation method results in a high-end estimate of the number of reports at various thresholds.

**TABLE G-2
ESTIMATED NUMBER OF FACILITIES POTENTIALLY PRODUCING OCS FROM
SELECTED MANUFACTURING SECTORS**

Industry Description	SIC Code^a	Total Facilities in 5-Digit Code^b	Total Facilities in 4-Digit Code^c	Facilities with ≥ 10 Employees in 4-Digit Code^c	% of Total Facilities with ≥ 10 Employees in 4-Digit Code	Estimated Facilities with ≥ 10 Employees in 5-Digit Code
Cyclic Organic Crudes and Intermediates, and Organic Dyes and Pigments	2865	149	209	165	79	118
Pesticides and Agricultural Chemicals	2879	127	242	144	60	76

n.e.c. - not elsewhere classified

NA - Information was not available

Sources:

^a Executive Office of the President, 1987

^b Department of Commerce, 1992.

^c Department of Commerce, 1995.

Magnesium Production (SIC Code 3339)

OCS has been identified as a potential byproduct of metallic magnesium production from magnesium chloride using carbon electrodes. According to the literature, annual OCS byproduct manufacture was estimated between 130 and 180 pounds from one facility located in Norway (Knutzen and Oehme, 1989). The actual concentration of OCS in the process wastes is unknown. Assuming that the magnesium plant in Norway was similar in size to the two US metallic magnesium producers, then between 260 and 360 pounds per year of OCS byproduct is expected from this process. Therefore, the two US metallic magnesium producers may report to TRI at thresholds of 1 pound, 10 pounds, and 100 pounds.

Aluminum Production (SIC Codes 3341 and 3365)

OCS is manufactured as a byproduct in the aluminum production industry when HCE is used to remove hydrogen gas from molten aluminum (Westberg et al., 1997). Quantitative information on the amount of OCS produced in comparison to the amount of HCE used was available from the literature (Westberg et al., 1997). This information was used to estimate the amount of OCS generated by the degassing process. According to The Aluminum Association (1998), five secondary aluminum smelting operations in the U.S. use HCE for degassing; this information was used to estimate the number of primary aluminum foundries that may use HCE for degassing.

According to the literature, a remelt furnace was charged with 70 kg of an aluminum alloy and degassed using two 50 g tablets containing 85% HCE (Westberg et al., 1997). This results in a ratio of 0.00121 lb HCE/lb aluminum alloy, as shown below.

$$(2 \times 50 \text{ g HCE} \times 85\%) / 70,000 \text{ g alloy} = 0.00121 \text{ g HCE} / \text{g alloy} = 0.00121 \text{ lb HCE} / \text{lb alloy}$$

Analysis of the emissions from the process detected 0.78 mg OCS per gram of HCE (Westberg et al., 1997). Using this information, an OCS:aluminum alloy ratio of 9.44×10^{-7} was calculated and is shown below.

$$(7.8 \times 10^{-4} \text{ g OCS} / \text{g HCE}) \times (0.00121 \text{ g HCE} / \text{g alloy}) = 9.44 \times 10^{-7} \text{ lbs OCS/lb aluminum alloy}$$

To estimate the number of aluminum foundries using HCE in degassing, the percentage of secondary smelting plants using HCE in degassing was applied to the number of aluminum foundries. These data are presented in Table G-3.

**TABLE G-3
ESTIMATED NUMBER OF ALUMINUM FOUNDRIES
USING HCE DEGASSING OPERATIONS**

SIC Code	Total Foundries ^a	Total Secondary Smelting Facilities ^a	Secondary Smelting Facilities Using HCE ^b	% of Total Secondary Smelting Facilities Using HCE	Estimated Foundries Using HCE
3365	591	72	5	7	41

Sources:

^aDepartment of Commerce, 1992

^bEPA, 1993

The amount of aluminum produced by secondary smelting facilities using HCE was available from The Aluminum Association (1998); however, only the total primary aluminum production was available from the listed references. Assuming that the foundries produce approximately equal amounts of aluminum each year, a scaling factor of 7% (calculated above) was applied to estimate the amount of primary aluminum production using HCE degassing operations. Table G-4 presents the estimated amount of OCS manufactured by the primary and secondary aluminum industry.

**TABLE G-4
ESTIMATED ALUMINUM INDUSTRY OCS MANUFACTURE**

SIC Code	Estimated Amount of Aluminum Manufactured (million lb/year)	OCS:Aluminum ratio	Total Estimated Amount of OCS Manufactured (lb/year)
3341	108 ^a	9.44×10^{-7}	102
3365	556 ^b	9.44×10^{-7}	525

Sources:

^aAluminum Association, 1998 (converted from 53,922 tons)

^b3,600,000 metric tons aluminum (USGS, 1998) x (2,205 lb / metric ton) x 7% using HCE = 556,000,000 lb aluminum using HCE

Commercial Hazardous Waste Treatment (SIC Code 4953)

OCS may be generated at incineration facilities during the thermal decomposition of plastic wastes. As indicated in the economic analysis of EPA's recent TRI industry expansion (EPA, 1997) 53 hazardous waste incinerators are now subject to the TRI reporting requirements. All of these incinerators are assumed to generate OCS in quantities exceeding the four regulatory options, but below current reporting thresholds.

Other Industry Sectors

The dry etching of aluminum conductors with CTC or boron trichloride for microelectronic components (SIC code 367) has been demonstrated to produce OCS byproduct (Raabe et al., 1993). Samples collected from a reactor contaminated with waste products from etching operations were composed of 0.6% OCS (Raabe et al., 1993). Quantitative information

is not currently available to estimate the total amount of OCS produced by aluminum etching or the number of facilities producing OCS by this process.

There may be a potential for incidental manufacturing of OCS at pulp mills (EPA, 1998); however, the pulp and paper industry has been drastically reducing its use of chlorine bleaches. Therefore, no pulp mills (SIC code 2611) were included in estimates of OCS reports to TRI.

Medical waste incinerators are not currently required to submit reports to TRI; however, they are considered to be potential producers of OCS through incineration of polyvinyl chloride (PVC) plastics.

There is a potential for OCS formation at cement kilns incinerating hazardous wastes. Based on professional knowledge of the industry, however, cement kilns are not expected to submit reports to TRI for OCS.

Summary

Industries manufacturing OCS that may submit TRI reports at the lowered thresholds are presented in Table G-5, along with the results of the analysis. Note that the table is presented in two parts since it is oversized. The first six columns are presented for all SIC codes followed by the last seven columns for all SIC codes. The last four columns provide the number of facilities expected to report to TRI at the various thresholds. The number of facilities expected to report at the various thresholds in the last four columns was determined from the amount of OCS manufactured per facility.

**TABLE G-5
ESTIMATES OF ADDITIONAL TRI REPORTING FOR OCTACHLOROSTYRENE (OCS)**

Industries	OCS Purpose/Use	TRI Activity Category	Total Amount of OCS (lb/yr)	No. of Facilities with >10 FTEs Potentially Subject to TRI Reporting Requirements	Amount per Facility (lb/yr)
Alkalies and Chlorine (SIC Code 2812)	Formed as a byproduct/impurity during electrolysis of chloride salts such as sodium chloride and magnesium chloride using carbon anodes (16)	Manufacture	7,300 (8, 17)	5 (20)	1,460
Cyclic Organic Crudes and Intermediates, and Organic Dyes and Pigments (SIC Code 2865)	Formed as a byproduct/impurity during chlorination of various organic compounds (16)	Manufacture	1,800 (8, 17)	1 ^a (17) - 118 (11, 12)	15 - 1,800
Industrial Organic Chemicals, n.e.c. (SIC Code 2869)	Formed as a byproduct/impurity during chlorination of various organic compounds (including propylene in the production of carbon tetrachloride and tetrachloroethylene by the Stauffer or Scientific Design processes) (8, 16, 17)	Manufacture	1,392,000 (8, 22)	3 (2)	464,000
Pesticides and Agricultural Chemicals, n.e.c. (SIC Code 2879)	Formed as a byproduct/impurity during pesticide manufacturing (16)	Manufacture	34,300 (8, 17)	3 ^a (17) - 76 (11, 12)	> 30,000 (1 facility) < 1,000 (75 facilities) (17)
Chemicals and Allied Products TOTAL (SIC Code 28)			1,435,000	12 - 202	

TABLE G-5 (Continued)
ESTIMATES OF ADDITIONAL TRI REPORTING FOR OCTACHLOROSTYRENE (OCS)

Industries	OCS Purpose/Use	TRI Activity Category	Total Amount of OCS (lb/yr)	No. of Facilities with >10 FTEs Potentially Subject to TRI Reporting Requirements	Amount per Facility (lb/yr)
Primary Smelting and Refining of Nonferrous Metals, Except Copper and Aluminum (SIC Code 3339)	Formed as a byproduct during the electrolytic production of metallic magnesium using carbon electrodes.	Manufacture	260-360 (6)	2 (25)	130-180
Secondary Smelting and Refining of Nonferrous Metals (SIC Code 3341)	Formed as a byproduct/impurity during degassing of molten aluminum with hexachloroethane (23)	Manufacture	100 (23, 24)	5 (24)	20
Aluminum Foundries (SIC Code 3365)	Formed as a byproduct/impurity during degassing of molten aluminum with hexachloroethane (23)	Manufacture	530 (21, 23)	41 (12, 23)	13
Primary Metal Industries TOTAL (SIC Code 33)			890-990	48	
Electroplating, Plating, Polishing, Anodizing, and Coloring (SIC Code 3471)	Formed as a byproduct/impurity during dry etching of aluminum with carbon tetrachloride or boron trichloride (10)	Manufacture	unknown ^b	unknown	unknown ^b
Refuse Systems (SIC Code 4953)	Received in waste streams	Otherwise Used	1,341,000	162 (14)	>1,000
TOTAL			1,436,000^c	222 - 412	

TABLE G-5 (Continued)
ESTIMATES OF ADDITIONAL TRI REPORTING FOR OCTACHLOROSTYRENE (OCS)

Industries	OCS Concentrations in Waste	Number of Facilities Reporting to TRI at Current Threshold	Number of Additional Reports Expected at Various Thresholds			
			>1 lb/yr	>10 lb/yr	>100 lb/yr	>1,000 lb/yr
Alkalies and Chlorine (SIC Code 2812)	5.5% (8)	NA	5	5	5	5
Cyclic Organic Crudes and Intermediates, and Organic Dyes and Pigments (SIC Code 2865)	5.5% (8)	NA	118	118	1 - 118	1
Industrial Organic Chemicals, n.e.c. (SIC Code 2869)	5.5% (8)	NA	3	3	3	3
Pesticides and Agricultural Chemicals, n.e.c. (SIC Code 2879)	5.5% (8)	NA	76	3 - 76	3	3
Chemicals and Allied Products TOTAL (SIC Code 28)		NA	202	129 - 202	12 - 129	12
Primary Smelting and Refining of Nonferrous Metals, Except Copper and Aluminum (SIC Code 3339)	Unknown	NA	2	2	2	0
Secondary Smelting and Refining of Nonferrous Metals (SIC Code 3341)	0.078% ^e (23)	NA	5	5	0	0

TABLE G-5 (Continued)
ESTIMATES OF ADDITIONAL TRI REPORTING FOR OCTACHLOROSTYRENE (OCS)

Industries	OCS Concentrations in Waste	Number of Facilities Reporting to TRI at Current Threshold	Number of Additional Reports Expected at Various Thresholds			
			>1 lb/yr	>10 lb/yr	>100 lb/yr	>1,000 lb/yr
Aluminum Foundries (SIC Code 3365)	0.078% ^e (23)	NA	41	41	0	0
Primary Metal Industries TOTAL (SIC Code 33)		NA	48	48	2	0
Electroplating, Plating, Polishing, Anodizing, and Coloring (SIC Code 3471)	0.6% (10)	NA	0	0	0	0
Refuse Systems (SIC Code 4953)	unknown ^d	NA	53	53	53	53
TOTAL		NA	303	230-303	67-184	65

TABLE G-5
ESTIMATES OF ADDITIONAL TRI REPORTING
FOR OCTACHLOROSTYRENE (OCS)

Footnotes

NA - not applicable

n.e.c. - not elsewhere classified

a - The low end of the range is the number of facilities in the 1995 TRI database (EPA, 1995b) that claim the 4-digit SIC code as their primary manufacturing description and that manufacture hexachlorobenzene as a byproduct or impurity.

b - OCS may be generated in these industries; however, the literature search did not show any information regarding the quantity generated. Additionally, no facilities in this SIC code filed TRI reports for HCB. Further research is required to estimate this quantity.

c - The total amount of OCS does not include the amount of OCS received by treatment, storage, and disposal facilities (TSDFs) to avoid double counting.

d - There are no available data on typical concentrations expected for OCS.

e - The OCS concentration is based on the amount of hexachloroethane used for degassing.

G.4 CONCLUSIONS

As a result of lowering the TRI reporting thresholds and adding OCS to the TRI, the estimated total number of reports for OCS at the various lower thresholds are summarized below. It should be noted that there is considerable uncertainty regarding potential sources and amounts of OCS.

- 1 lb/yr - 303;
- 10 lb/yr - 230 to 303;
- 100 lb/yr - 67 to 184; and
- 1,000 lb/yr - 65.

LITERATURE CITED

1. Canada-Ontario Agreement (1994). First Progress Report Under the 1994 Canada-Ontario Agreement.
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Mr. Eric Ginsburg
Office of Air Quality Planning and Standards (MD-15)
Air Quality Strategies and Standards Division
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711

Re: Source Category Listing for Section 112(d)(2) Rulemaking
Pursuant to Section 112(c)(6) Requirements (63 *Federal
Register* 17838, April 10, 1998)

Dear Mr. Ginsburg:

The Halogenated Solvents Industry Alliance, Inc. (HSIA) remains very concerned about the Agency's mischaracterization of the contribution to hexachlorobenzene (HCB) emissions of the production of trichloroethylene, perchloroethylene, 1,1,1-trichloroethane, carbon tetrachloride and ethylene dichloride in its inventory of Section 112(c)(6) pollutants. Although we appreciate that EPA is not proposing to take further action to control chlorinated solvents production, we believe that it is important that the inventory accurately reflect the available emissions information for these sources. HSIA is a trade association representing the manufacturers and many users of several chlorinated solvents. These comments supplement those we made in response to the Agency's draft inventory published on June 20, 1997.

HSIA's concerns about the characterization of the contribution of chlorinated solvent production to the HCB emission inventory are two-fold. First, the Agency has decided to exclude the two largest sources of HCB emissions -- pesticide application and utility coal combustion -- from the 112(d)(2) inventory. Second, the Agency's estimates for chlorinated solvents production are based on a flawed extrapolation from a small number of facilities.

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Exclusion of Pesticide Application and Utility Coal Combustion

The result of excluding the two largest sources is the suggestion that the remaining sources, including chlorinated solvents production, contribute significantly to HCB emissions when they are actually quite small in comparison. In fact, according to the 1993 report by TRC Environmental that is the basis for EPA's estimate of emissions from solvent production, emissions from the application of certain pesticides dwarfs all other sources.

EPA has explained its rationale for excluding pesticide application from the inventory, but has not explained the significant difference between the estimate of 404,197 pounds from the TRC report and that of 292 pounds in the April 1998 inventory. Moreover, EPA's April 1998 final report notes that more recent data suggest that pesticide application emissions are actually lower than the estimate used. Similar data have been provided for chlorinated solvent production by HSIA in response to the June 20, 1997 *Federal Register* notice, but are not referenced in the April 1998 report.

HSIA disagrees, moreover, with the Agency's decision not to credit possible reductions in emissions from utilities achieved as a result of implementation of Section 112(n)(1)(A) in the 112(c)(6) process. While the statutory language does not require EPA to control emissions of utilities to address the 112(c)(6) pollutants, it clearly does not preclude EPA from doing so nor from taking credit for reductions achieved under other requirements of Section 112. Although 112(n)(1)(A) may be the appropriate authority for evaluating utility emissions, any reductions achieved under that authority should be taken into account in the inventory of source categories for 112(c)(6) pollutants. This is particularly true since any controls on utilities likely will be implemented through 112(d).

Overestimate of Emissions from Chlorinated Solvents Production

In its July 21, 1997 comments, HSIA provided data concerning actual measurements of HCB emissions from chlorinated solvents production. In response to these comments, the Agency argued that its estimates are preferable because they are based on industry-reported emissions from the 1990 Toxic Release Inventory (TRI) database. In fact, however, only six of the 21 solvents production facilities identified by EPA reported HCB emissions in their 1990 TRI reports. Emissions for the remaining 15 facilities, accounting for 55 percent of the total estimate for the category, were based on extrapolations from the six facilities

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and the production capacity. The information submitted by HSIA, moreover, suggests that the TRI data for the six facilities may have significantly overestimated actual HCB emissions.

All of the 15 facilities for which emissions were estimated submitted TRI reports for 1990, but did not report emissions of HCB. Neither the contractor nor EPA has provided the rationale for concluding that these companies were in error by not reporting HCB emissions. HSIA, on the other hand, has provided a rationale for concluding that HCB emissions from these facilities may actually be zero. The contractor and EPA also fail to provide any basis for assuming that emissions from these 15 facilities would be similar to the other six, or why production capacity, rather than actual 1990 production, was used. Production numbers for the solvents of interest for 1990 are readily available and could be easily apportioned among the manufacturing facilities, if necessary.

HSIA has reviewed the TRI reporting for several of the 15 facilities whose emissions were estimated. The largest contributor -- AKZO in Alabama (an estimated 222 pounds) -- has not reported HCB emissions in any of its TRI reports since 1990. The next largest contributor -- Occidental Chemical in Texas (an estimated 123 pounds) reported 25 pounds of HCB emissions in 1991, but not in any subsequent year. Two other facilities that HSIA investigated -- Westlake Monomers in Kentucky (an estimated 20 pounds) and Formosa Plastics in Louisiana (an estimated 10 pounds) -- also have not reported HCB emissions in their TRI reports in any year since 1990. One of these companies -- Westlake Monomers -- reported releases of HCB in 1991 through 1995, but none were to the air.

While defending the use of extrapolations for chlorinated solvent production, the Agency acknowledges that it based emissions for another identified source category, pesticide manufacture, solely on the emissions reported under the TRI requirement. In the April 1988 final inventory report, EPA makes no attempt to extrapolate to other manufacturing facilities, as it did for chlorinated solvent production, despite acknowledging that it is "probable" that emissions from pesticide manufacture are underestimated. This acknowledgment, moreover, is not discussed in the April 10, 1998 notice.

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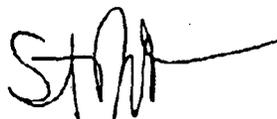
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Summary

In summary, HSIA believes that the final HCB inventory incorrectly overemphasizes emissions from chlorinated solvents production by (1) eliminating the two largest sources of HCB emissions from the inventory and (2) inappropriately estimating emissions from 15 of the 21 manufacturing facilities. We believe that the Agency must correct these problems to more accurately reflect the inventory of HCB emissions. Without such corrections, an uninformed reader would incorrectly conclude that chlorinated solvent production is a significant source of HCB.

We would like to discuss this matter further with you and your staff. Perhaps the next step would be a meeting of EPA and HSIA representatives who have the relevant technical expertise. I will plan to call you in the next couple of weeks to discuss such a meeting. Please feel free to call me in the meantime.

Sincerely,

A handwritten signature in black ink, appearing to read 'S. P. Risotto', with a long horizontal flourish extending to the right.

Stephen P. Risotto
Executive Director

cc: Patrick Chang, EPA/OGC